



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 5  
77 WEST JACKSON BOULEVARD  
CHICAGO, IL 60604-3590

REPLY TO THE ATTENTION OF:

SR- 6J

February 27, 2014

Mr. Chase Fortenberry  
Georgia-Pacific LLC  
133 Peachtree Street NE  
Atlanta, GA 30303

RE: Area 2: Revised Draft Supplemental Remedial Investigation Report and  
Alternatives Screening Technical Memorandum

Dear Mr. Fortenberry:

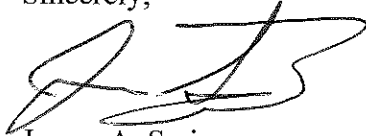
The U.S. Environmental Protection Agency (EPA) has completed its review of the Area 2 revised draft Supplemental Remedial Investigation (RI) report, submitted on September 20, 2013, for the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site. The original RI report was submitted on November 1, 2012 and disapproved by EPA on April 8, 2013. The RI report presents the data evaluation and the nature and extent of contamination for Area 2 of the Kalamazoo River from the former Plainwell dam to the Otsego City dam.

EPA has significant comments on the revised draft RI report which requires revision of the document. Enclosed are EPA's comments on the RI report. Therefore, EPA disapproves the Area 2 RI report pending receipt of adequate responses to the enclosed comments and a revised report. Pursuant to the 2007 Agreement on Consent a revised final RI report is due (60) sixty days after receipt of this letter.

In addition, since EPA and GP have had several opportunities to discuss the data from the RI report, and no further data appears necessary to develop remedial alternatives, the Area 2 Alternatives Screening Technical Memorandum must be submitted to EPA by June 2, 2014.

Please contact me at (312) 886-0992 if you have any questions regarding this matter.

Sincerely,

A handwritten signature in black ink, appearing to read 'J. Saric', with a stylized flourish at the end.

James A. Saric  
Remedial Project Manager  
SFD Remedial Response Branch #1

Enclosure

cc: Paul Bucholtz, MDNRE  
Garry Griffith, Georgia-Pacific  
Richard Gay, Weyerhaeuser  
Jamie McCarthy, KRWC

## US EPA COMMENTS ON THE REVISED AREA 2 SRI REPORT

### GENERAL COMMENTS

Commenting Organization: EPA  
General Comment: 1

Commenter: Keiser

In general, the revised text has become disjointed and fails to tie events and observations together to tell the story of what has happened and current conditions at the site.

Commenting Organization: EPA  
General Comment: 2

Commenter: Saric

The Executive Summary needs to be condensed, rewritten, and appropriate figures included to provide a useful summary of major conclusions. It should only highlight the key results and conclusions of the SRI. There is too much background and unnecessary information (e.g., the section labeled 'Study Area Investigation Characterization Methods' that includes a bullet list of data collection events covering more than a page.

Commenting Organization: EPA  
General Comment: 3

Commenter: Keiser

The main body of the report should include statistical summaries for each matrix (by subarea or other sample grouping as appropriate); tables of sample results can go in an appendix. Include side-by-side box plots by subarea for sediment.

Commenting Organization: EPA  
General Comment: 4

Commenter: Keiser

Provide graphics to support observations stated in the text (e.g., PCB concentrations are higher closer to the river banks)

Commenting Organization: EPA  
General Comment: 5

Commenter: Keiser/Saric

The description of the nature and extent of contamination in sediment requires additional detail. The discussion of the horizontal and vertical extent of PCB contamination is limited to two paragraphs and does not provide a good understanding of the site. The RI should more fully describe the nature and extent in terms of the conceptual site model (i.e., PCB distribution as it relates to timing of releases, geomorphology, and dam history). These sections require additional detail to present a clear understanding of the nature and extent. Combining these with historic air photographic information may be useful as well.

The discussion of surface water contamination is also incomplete. The previous draft provided a more comprehensive and informative surface water data analysis. The document should provide a discussion of the relationships between PCB vs. season, PCB vs. flow, PCB vs. TSS (while controlling for the other variables). Include graphics that show surface water results for

each sample, not just yearly averages. The document should also look at TSS vs. flow to see if the erosion threshold can be identified.

**Commenting Organization: EPA**

**Commenter: Saric**

**General Comment: 6**

While there are numerous figures and maps in the document, there are none which actually provide a useful summary of the PCB distribution found in Area 2 and those provided often are overloaded with excessive, irrelevant information. New figures are needed that will clearly show PCB distribution and the levels found in sediments and soils.

**Commenting Organization: EPA**

**Commenter: Saric**

**General Comment: 7**

The organization of the report is confusing (and somewhat redundant) with respect to how text, tables, figures are separated by pre-SRI and SRI. The reader should be able to read one section or look at one figure to find where soil/sediment samples have been collected and what data are being used in the analysis regardless if it was labeled pre-SRI or SRI. For example, Figure 2-1 shows data collected from 1993 to 2002, while Figure 2-6 (for sediment) and Figures 2-7a-d (for soil) show those collected in 2011/2012. Similarly, Figure 3-4 shows sediment thickness from 1993 and then Figure 4-17 (presumably) shows all data for sediment.

**Commenting Organization: EPA**

**Commenter: Saric**

**General Comment: 8**

Statistical evaluations to estimate the mean using IPWC are being conducted on only four intervals: 0-6", 6"-12", 12"-24". Therefore, sediment and soils greater than 24 inches are not being considered. Nature and extent evaluations should be done using all depth, not just the top 24-inches especially considering there are many deep deposits within Area 2.

**Commenting Organization: EPA**

**Commenter: Saric**

**General Comment: 9**

The Area 2 SRI is not the place for identifying areas that may require or not require remediation. This should be conducted through a formalized FS process that includes development of remedial action objectives (RAOs) and preliminary remediation goals (PRGs) based on the results of the human health and ecological risk assessments. The SRI should be determining if there is risk from sediment and soil concentrations that requires the development of a FS. Based upon the available data it's clear that there is a risk in both sediment and floodplain soil that requires an evaluation of Area 2. The ASTM or FS may evaluate portions of Area 2 that may require no further action.

**Commenting Organization: EPA**  
**General Comment: 10**

**Commenter: Saric**

Although the floodplain PCB target is 11 mg/kg for surface (0-6 inches), areas less than 11 mg/kg will still need to be evaluated in the FS for potential further action. Similar to Area 1 an evaluation of home ranges exceeding 11 mg/kg along with an evaluation of how various Remedial Action Levels may increase the number of home ranges protected will need to be conducted in all floodplain portions of Area 2.

**Commenting Organization: EPA**  
**General Comment: 11**

**Commenter: Keiser/Saric**

The bull's eye figures 4-14 are difficult to interpret. The layered figures depicting soil and sediment concentrations within sample intervals provided in the previous document are preferred.

**Commenting Organization: EPA**  
**General Comment: 12**

**Commenter: Saric**

The report needs to provide figures that combine both sediment and soil data. It's important to be able to visualize the location of sediment hot spots in relation to soil hot spots and vice-versa. Maps to be included in the SRI are maximum PCB concentrations for both soil and sediment and individual maps illustrating PCB concentration with each depth interval from the surface to maximum depths of 60 inches in some areas. This is necessary to demonstrate the horizontal and vertical nature and extent of contamination in both sediment and soil.

**Commenting Organization: EPA**  
**General Comment: 13**

**Commenter: Keiser**

The previous draft included figures with both soil and sediment concentrations by layer. This is preferable to completely separating the two media.

**Commenting Organization: EPA**  
**General Comment: 14**

**Commenter: Saric**

All figures should include the study area boundary.

**Commenting Organization: EPA**  
**General Comment: 15**

**Commenter: Keiser**

The development of SWACs is described in much more detail than the nature and extent. This SWAC information seems more relevant to the FS.

**Commenting Organization: EPA**  
**General Comment: 16**

**Commenter: White**

The hydrodynamic modeling results include presentations of inundation, velocities, and bottom shear stresses for various flow levels for the present-day and dam-out scenarios. The maps of bottom shear stresses show similar patterns and numerical values as shown in the November

2012 Draft Area 2 SRI report. However, the draft report maps show bottom shear stresses in units of  $\text{N/m}^2$ , and the revised draft report maps show units of  $\text{lb/ft}^2$ , which is two orders of magnitude lower ( $1 \text{ N/m}^2 = 0.021 \text{ lb/ft}^2$ ). Which units are correct? Conclusions regarding potential sediment mobility would be vastly different depending on which units are correct. The inundations and velocities reported in the draft and revised draft SRI reports are comparable.

**Commenting Organization: EPA**  
**General Comment: 17**

**Commenter: White**

The report states that the hydrodynamic model results will be “merged” with sediment grain size data to characterize sediment transport and deposition as part of future modeling work. As discussed in the June 28, 2013 conference call, a sediment transport model is not going to be developed. The SRI report should identify areas of potential sediment and PCB erosion and transport based on hydrodynamic model results and mobility thresholds based on critical shear stress estimates.

**Commenting Organization: EPA**  
**General Comment: 18**

**Commenter: Dillon**

As discussed during the November 21, 2013 meeting, EPA had commented that the Area 1 TBERA lacked sufficient transparency in the tables to allow for easy replication of calculations. EPA further suggested that these deficiencies be address in the Area 2 TBERA. The plan was to work with GP and Arcadis to develop acceptable presentation of the risk calculations. It appears that Arcadis made an attempt to address EPA’s concerns in their initial draft of the Area 2 TBERA. EPA still has some concerns and suggestions for the TBERA tables. These concerns and suggestions will be identified in the specific comments, but as discussed during the November 21<sup>st</sup> meeting a working session the review the comments and discuss modifications will be the most effective approach to address the remaining TBERA concerns.

**Commenting Organization: EPA**  
**General Comment: 19**

**Commenter: Dillon**

The draft Area 2 TBERA prepared by AMEC does a good job of building off the Area 1 TBERA and addressing EPA’s remaining concerns about the uncertainty related to avian sensitivity to dioxin-like PCBs. However, including the full TBERA text and analysis in the main body of the SRI report leads to an imbalanced presentation of the materials. An option discussed during the November 21<sup>st</sup> meeting was to streamline the text and reference the Area 1 TBERA more. Upon further review and consideration, EPA prefers that the Area 2 SRI follow the general approach of the Area 1 SRI and that the full TBERA text, tables, figures and attachments be presented as an appendix and that a summary be presented in the main body of the SRI.

**Commenting Organization: EPA**  
**General Comment: 20**

**Commenter: Dillon**

The TBERA text needs a thorough editorial review. For example, there are many incidences of missing spaces and scientific names that are not italicized.

Commenting Organization: EPA  
General Comment: 21

Commenter: Keiser

The document attempts to screen out sediments in subareas A and B prior to the FS. All media in all subareas should be carried forward to the FS for proper screening of the entire area. The difference between soils and sediments is not definitive and sediments should not be evaluated without consideration of adjacent soils.

Commenting Organization: EPA  
General Comment: 22

Commenter: Saric

The document presents the results of the data for the non-PCB constituents, but does not present any conclusions. Further, the document does not screen any specific non-PCB constituents or mention the need to carry them forward into the FS analysis. The RI needs to address both PCB and non-PCB constituents, as well as discuss chemicals of potential concern versus chemicals of concern that may need to be carried forward into the FS analysis.

#### SPECIFIC COMMENTS

Commenting Organization: EPA  
Section: ES Page: ES-ix Lines: End of paragraph 4  
Specific Comment: 1

Commenter: Mitchell

Text states "*Generally, finer-grained, uncompacted materials are more easily transported than coarse-grained sediment.*"

This statement should clarify that it is referring only to non-cohesive sediment. This statement is not true for cohesive sediments which are likely present in the exposed banks and in the floodplain. Furthermore, the report does not state whether cohesive sediments are present or describe their relative importance at this particular site. If cohesive sediments are present they will exert a first-order control on sediment transport.

Commenting Organization: EPA  
Section: ES Page: ES-x Lines: First sentence  
Specific Comment: 2

Commenter: Mitchell

Text states "*...mobilization of floodplain soil via erosion into the river is not expected to be a major transport mechanism during base flow or moderate flow conditions such as the 2 year flood event.*"

This statement is not consistent with the model results shown for the 2-YR event (Exhibit 5-21) which shows extremely high shear stresses in the floodplain, well above the critical shear stress for the particle sizes present. However, the shear stress results appear to be incorrect (see General comment 16).

More broadly however, this statement seems to dismiss the idea that PCBs could be mobilized from the floodplain through the processes of bank erosion, or an avulsion of a relic channel braid, at moderate flows such as a 2-YR event. This portion of the Executive Summary should be revised after the specific comments related to the modeling results are addressed.

Commenting Organization: EPA

Section: ES, Fate and Transport/Conceptual Site Model

Specific Comment: 3

Commenter: Mitchell

Page: ES-x

Lines: entire section

The Conceptual Site Model section of the ES should include a summary of the river's geomorphic characteristics and current trends. What are the general characteristics of the backwatered braided reach? Is the reach aggrading or incising? Have historic events (i.e. removal of Plainwell Dam) affected the rivers current geomorphic trends? How stable is the lateral plan form? What are the first-order controls on sediment transport? What are the relative PCB source contributions (X% upstream, Y% from bank erosion and Z% from bed erosion)?

Commenting Organization: EPA

Section: ES

Page: ES-x Lines: First paragraph

Specific Comment: 4

Commenter: Mitchell/White

State the purpose and objectives of the model. What questions is the model intended to evaluate? These need to be explicitly stated in order for the results and interpretations to be useful. As discussed in the June 28, 2013 conference call to discuss the hydrodynamic modeling effort, the following objectives were identified: (1) identify areas of concern with respect to potential erosion and downstream transport of PCB-contaminated sediment and floodplain soil under various flow conditions, including an extreme (100-year) flow event; (2) assess the potential for future exposure of buried PCB contamination in areas where surface sediment PCB concentrations are acceptable; and (3) evaluate both dam-in and dam-out scenarios.

Commenting Organization: EPA

Section: ES

Page: ES-x Lines: Fourth paragraph

Specific Comment: 5

Commenter: Mitchell/White

Text states: *"Bed shear stress is important for future assessment of sediment transport, erosion, deposition and the resulting morphological evolution."*

Bed shear stress can only provide insight into thresholds for erosion, or rates of erosion if the sediments are cohesive. Deposition and morphological change cannot be predicted based on bed shear stress alone. This text and any interpretations made on this premise are overstating the value of a single hydrodynamic output (shear stress). The modeling objectives discussed in the June 28, 2013 conference call did not include sediment transport modeling to assess sediment transport patterns or morphological evolution. The text should be revised to accurately reflect the modeling objectives and approach.

Commenting Organization: EPA

Section: ES

Page: ES-x Lines: Last paragraph

Specific Comment: 6

Commenter: Mitchell

Text states: *"The areas that exhibit higher concentrations in sediments, Subareas D1 and E, have low shear stress values and low velocities, even under high flow conditions (25-year and 100-year flood conditions), for the dam-in scenario indicating that PCBs are unlikely to mobilize under current conditions."*



It's hard to read the precise shear stress values but they appear to be greater than 1 lb/ft<sup>2</sup> in which case they would be mobile. More generally, the shear stress values shown on the exhibits are extremely high - too high to be reasonable. There is either an error in the unit labeling or the calculation of bed shear stress is incorrect (see General Comment 16).

Cite the reference used as the basis of comparison between modeled shear stress to threshold shear stress (critical shear stress), if such a quantitative comparison was made.

**Commenting Organization:** EPA  
**Section:** 2.1.1      **Page:** 2-1  
**Specific Comment:** 7

**Commenter:** Mitchell

Specify whether each of the surveys was single-beam or multi-beam surveys.

Add a figure showing the actual data so readers can see the resolution and extent of each survey. The figure showing the final terrain model only shows the final product after interpolation.

This section should also describe the available topographic data.

**Commenting Organization:** EPA  
**Section:** 2.1.3  
**Specific Comment:** 8

**Commenter:** White

A surface water sample location map should be cited in this section.

**Commenting Organization:** EPA  
**Section:** 2.1.3.2  
**Specific Comment:** 9

**Commenter:** White

"Note that this report has not necessarily been approved by MDEQ or USEPA." Delete the word "necessarily" if the report was not approved.

**Commenting Organization:** EPA  
**Section:** 2.1.4.4  
**Specific Comment:** 10

**Commenter:** White

The Weyerhaeuser sediment core locations should be shown on Figure 2-1.

**Commenting Organization:** EPA  
**Section:** Figure 2-2  
**Specific Comment:** 11

**Commenter:** White

Figure 2-2 is not cited in Section 2.

Commenting Organization: EPA  
Section: Figure 2-4  
Specific Comment: 12

Commenter: White

The title of Figure 2-4 should be revised as follows: "Approximate Extent of Sediment Deposits in Braided Channels" (emphasis added).

Commenting Organization: EPA  
Section: 2.2.2.5  
Specific Comment: 13

Commenter: White

Section 2.2.2.5 indicates that the Otsego Dam spillway elevation is 699 feet NGVD29. Should this be 695 feet NGVD29 as reported in Section 1.2.1 and Section 3.1?

Commenting Organization: EPA  
Section: Table 2-2  
Specific Comment: 14

Commenter: White

Why weren't the Sedflume data used in the Area 2 SRI? Will they be used in the FS?

Commenting Organization: EPA  
Section: 3.1.1  
Specific Comment: 15

Commenter: White

First sentence: 679 feet should be changed to 697 feet.

Commenting Organization: EPA  
Section: 3.1.2  
Specific Comment: 16

Commenter: White

Second paragraph, third and fourth sentences: it is not clear whether the reported values are gage heights for the Comstock gage or estimated water depths for Area 2. Please clarify.

Commenting Organization: EPA  
Section: 3.4.1  
Specific Comment: 17

Commenter: Mitchell

Text states: "*These lacustrine deposits in the impoundment consist of interbedded, organic-rich silt and clay, fine to medium sand, and some gravel (Rheaume et al. 2004).*"

This qualitative description is not particularly useful. The quantitative measures are of primary concern, especially the percent clay (or percent finer than 9 microns) as it relates to cohesion. The erodability of the lacustrine material should be central to the discussion and the degree of cohesion is of fundamental importance.

Commenting Organization: EPA  
Section: 3.5.1  
Specific Comment: 18

Commenter: Mitchell

This section needs to include a discussion of geomorphology. Understanding the geomorphic trends is essential, especially in the context of considering the "no action" and MNR alternatives in the future.

Commenting Organization: EPA  
Section: Figure 3-6  
Specific Comment: 19

Commenter: White

Figures 3-6a through 3-6d are not cited in Section 3.

Commenting Organization: EPA  
Section: 4.1  
Specific Comment: 20

Commenter: White

First paragraph under the bullets: "PCB data collected during the 1993 sampling events were analyzed as Total Aroclor PCBs, while later data were analyzed as congener PCBs." This sentence should be revised to indicate that surface water samples collected by the PRPs were analyzed for PCB Aroclors and samples collected by MDEQ were analyzed for PCB congeners.

Commenting Organization: EPA  
Section: Figure 4-1  
Specific Comment: 21

Commenter: White

Please add sample location #5 at the Otsego City Dam.

Commenting Organization: EPA  
Section: Table 4-1  
Specific Comment: 22

Commenter: White

Table 4-1 should separate the results for Total PCB Aroclors and Total PCB congeners and label accordingly.

Commenting Organization: EPA  
Section: 4.1.1  
Specific Comment: 23

Commenter: White

The second and third paragraphs in this section discuss average PCB concentrations by sample location and year. Please add a summary table reporting the average concentrations and standard error for each sample location and year.

**Commenting Organization: EPA**  
**Section: 4.1.1**  
**Specific Comment: 24**

**Commenter: White**

Last paragraph: "For example, seasonal flow analysis showed no apparent correlation with PCB results. These seasonal trends do not coincide with consistently decreasing concentrations in the river, as shown on Figures 4-3 and 4-4." Please revisit this conclusion. Figures 4-3 and 4-4 appear to show that yearly average PCB concentrations are generally lower in the winter than in the summer (apparent seasonal differences are also shown in Figure 5.4-4 of the November 2012 draft Area 2 SRI report).

**Commenting Organization: EPA**  
**Section: 4.1.2**  
**Specific Comment: 25**

**Commenter: White**

"TSS concentrations do not appear to correlate with seasonal changes or flow, as shown on Figures 4-6 and 4-7." Please revisit this conclusion. Figures 4-6 and 4-7 appear to show that yearly average TSS concentrations are generally lower in the winter than in the summer (apparent seasonal differences are also shown in Figure 5.4-5 of the November 2012 draft Area 2 SRI report). The second bullet in Section 7.1.1 states that "seasonal analysis of TSS concentrations in Area 2 generally showed an increase during the summer months compared to the winter months." Additionally, the Farmer Street bridge data for the winter months from 2001-2006 appear to show a relationship between TSS and flow, and between PCB and flow. Figures 5.4-6 and 5.4-7 of the November 2012 draft Area 2 SRI report show that PCB and TSS concentrations both increase between flows of 2500 and 3000 cfs.

**Commenting Organization: EPA**  
**Section: 4.2**                      **Page: 4-5**  
**Specific Comment: 26**

**Commenter: White**

Top of page: delete references to Portage Creek, Crown Vantage and the Plainwell No 2 dam area because these are in Area 1.

**Commenting Organization: EPA**  
**Section: 4.2.1**  
**Specific Comment: 27**

**Commenter: White**

Last sentence: "Use of the pre-SRI data provides a conservative representation of present-day sediment conditions, due to the tendency of natural recovery processes to reduce PCB exposure concentrations over time." This would be the case if all sources of PCBs to Area 2 were controlled after the pre-SRI data were collected. However, the 2007-2009 TCRA in former Plainwell Dam area left a mid-channel prism of sediment that was expected to gradually erode over time. This sentence should be revised accordingly (see GP response to EPA specific comment 30 on the draft Area 2 SRI report).

Commenting Organization: EPA  
Section: Table 4-11  
Specific Comment: 28

Commenter: White

This table only reports minimum and maximum concentrations in each sub-area. Please provide a more complete statistical summary (minimum, maximum, mean, standard deviation, median).

Commenting Organization: EPA  
Section: 4.2.1.2  
Specific Comment: 29

Commenter: White

The description of the horizontal and vertical distribution of PCBs in Area 2 sediments by subarea is limited to only two short paragraphs. The PCB spatial distribution patterns shown in Figure 4-11 should be described in more detail. Please provide a separate map for each depth interval because the spatial patterns are hard to discern from the stacked symbols (this comment also applies to Figure 4-14). The expanded statistical summaries in Table 4-11 should be used to support the more detailed discussion of horizontal and vertical distribution of PCBs. Consider adding side-by-side box plots of PCB concentrations in each sub-area and depth interval.

Commenting Organization: EPA  
Section: 4.2.1.4  
Specific Comment: 30

Commenter: White

The discussion in this section references tables in Appendix D. Please add these tables to the main body of the report.

Commenting Organization: EPA  
Section: 4.5  
Specific Comment: 31

Commenter: White

The information in this section should be moved to Section 3 (Physical Characteristics of the Study Area) because it is not related to the nature and extent of contamination.

Commenting Organization: EPA  
Section: 5.1.2.1  
Specific Comment: 32

Commenter: Mitchell

Text states: *"In sinuous and meandering streams, bank erosion is most often focused on the outside of a meander bend, with the eroded sediment from one bank typically being deposited downstream, on the inside of the meander bend to form a point bar."*

This reach is not a sinuous meandering stream - it is a braided channel - the geomorphic processes are radically different in a braided system. Braided streams are typically over supplied with sediment, or are transport limited (in this case caused by the backwater). This leads to aggradation and filling of existing channel braids, forcing overbank flows to cut new channels, or reoccupy relic channels in the floodplain. These systems are typically dynamic and unstable. Lateral bank erosion may also occur (as described here) but the dominant channel

dynamics are very different from the processes described here for a meandering channel and the conclusions drawn about the stability of the floodplain sediments are at odds with the characteristic of a braided channel system. Revise this section accordingly.

Commenting Organization: EPA

Commenter: Mitchell

Section: 5.1.2.2

Specific Comment: 33

Text states: *"Given the generally flat topography and well-vegetated state of most of the floodplain in Area 2, mobilization of floodplain soil via erosion into the river is not expected to be a major transport mechanism.*

What about development of new braided channels that cut vertically through the floodplain sediments? Exhibit 1-3 that compares the channel plan form over a 61-year period shows significant planform change which is evidence that the system is dynamic and quite capable of continuing to erode into the contaminated floodplain. Couldn't this also be a significant source of PCBs to the river?

Commenting Organization: EPA

Commenter: Mitchell

Section: 5.1.3      Page: 5-3

Specific Comment: 34

This is an overly generalized description of cohesive sediments with no discussion of site-specific information. The degree of cohesion in fine-grained sediments varies greatly (as a function of mineralogy, percent clay, cation exchange capacity, organic content, salinity, etc.) and can either have a negligible effect or provide a first-order control on erosion and sediment transport. All relevant site specific data should be reported here and the implications as they relate to the role of cohesion at this site should be discussed in this section.

Commenting Organization: EPA

Commenter: White

Section: 5.1.3      Page: 5-3 and 5-4

Specific Comment: 35

These bullets describe changes in channel cross-section profiles at selected locations between 2001 and 2011. Please include figures showing the profiles discussed in these bullets in the main body of the report.

Commenting Organization: EPA

Commenter: Mitchell

Section: 5.3      Page: 5-5

Specific Comment: 36

This section introduces two modeling scenarios but fails to state the purpose and objectives of the model in general and the specific objectives for each scenario. Incorporate the modeling objectives discussed in June 2013 as identified in Specific Comment 4.

Commenting Organization: EPA  
Section: 5.3.1 Page: 5-6  
Specific Comment: 37

Commenter: Mitchell

Revise the section titled "River Reach Description" to report the channel slope - a fundamental reach-scale characteristic that provides tremendous insight into the rivers potential power and its ability to mobilize sediment.

Commenting Organization: EPA  
Section: 5.3.1.1  
Specific Comment: 38

Commenter: Mitchell

Table 5-1 is displayed without any introduction or description of the analysis behind it. The table should be introduced after the supporting narrative.

In the following paragraph the text states: *"Time series of mean daily flows were developed for the Kalamazoo River at the former Plainwell Dam and at Otsego City Dam, and for Gun River at its confluence, by adjusting the flows from the Comstock station in proportion to drainage area. These mean daily flow data were used to compare the range of flows expected by month for the Kalamazoo River at Otsego City Dam (Figure 5-2)."*

- First, explain why data from the USGS gage at Plainwell Dam wasn't used as the basis for characterizing flows at Plainwell Dam and thus why an alternate method was needed to estimate flows at Plainwell Dam. Presumably the data were not used due to the relatively short period of record. Nevertheless, the measured data should still be compared with estimated flows to validate the approach.
- Secondly, the method used to estimate flows for Gun River is inappropriate. Adjusting flows by the ratio of their drainage areas is only appropriate when the two locations are on the same river and the adjustment is modest and unaffected by reservoirs or diversions. Using a ratio of areas approach on the Gun River violates the basic premise of the methodology - that the two watersheds have similar characteristics. The drainage area of the Kalamazoo River at Comstock is 10 times larger than the Gun River. The runoff characteristics of the Gun River would be expected to be much more "flashy" and experience higher peak flows per area and lower low-flows per area compared to the Kalamazoo. This pattern is even observable in the relationship between the largest and smallest watersheds compared in Appendix G. Low flows/area at Comstock are 20% lower than those at Richmond and 20% higher/area at high flows and their watershed areas are much more similar. The Gun River flow estimates are very crude - low flow are not low enough and the high flow estimates are too low. More accurate peak flow estimates may have been developed by FEMA. Check the local FEMA Flood Insurance Study.

Commenting Organization: EPA  
Section: 5.3.1.1  
Specific Comment: 39

Commenter: Mitchell

Text states: *"Comstock peak flow estimates that had been adjusted in proportion to drainage area were found to be within 10 percent greater than (and mostly within 5 percent greater than) data for the*

Fennville Station. This indicated that nonlinearity of flows was a relatively small effect. The flows used in DELFT3D modeling were also adjusted proportional to area and found to compare well with the two sets of peak flow data.

Three comments:

- A difference of 10% in peak flows is not insignificant. A 10% difference can be the difference between a 50-year flood and a 100-yr flood.
- The relationship is well known to be nonlinear and there are commonly used power functions that account for this nonlinearity. The ratio of drainage areas is often raised to the power of around 0.9. There may be regional coefficients published for this area.
- What's the difference between the adjusted Comstock flows and the flows used in the DELFT3D model? Clarify this narrative.

Commenting Organization: EPA

Commenter: Mitchell

Section: 5.3.1.2 Page: 5-9

Specific Comment: 40

Text states: "Available water elevation and flow data were used to estimate the hydraulic roughness parameter (Manning *n*-values) rather than making this estimate from grain size data."

State, or reference, the specific water surface elevation data available. Describe how the hydraulic roughness parameters were developed from this data, or reference the section that describes this analysis.

Commenting Organization: EPA

Commenter: Mitchell

Section: 5.3.1.2 Page: 5-9

Specific Comment: 41

The last paragraph describing physical sediment characteristics includes only a qualitative description of the particle sizes present. List the quantitative fractions or provide the soil classification. The particle sizes range from clay to gravel. The mix of these fractions is critical to the mobility of bed.

Commenting Organization: EPA

Commenter: Mitchell

Section: 5.3.1.2 Page: 5-10

Specific Comment: 42

Text states: "Syed et al (2005) used a median surface sediment size of 0.0625 to 1.609 mm upstream of the Otsego City Dam. Wells et al (2003) defined channel sediments for modeling as being 95 percent silt/clay and 5 percent sand."

Reporting pre-SRI or SRI lab results would be more useful than citing what others have reported. Either explain why literature values were used, or update using site-specific grain size data.

Commenting Organization: EPA

Commenter: Mitchell

Section: 5.3.2 Page: 5-10

Specific Comment: 43

This section describes two different scenarios and the range of flows to be modeled. List the purpose and objective for each scenario and flow.



Commenting Organization: EPA  
Section: 5.3.2 Page: 5-10  
Specific Comment: 44

Commenter: Mitchell

The report says that all flow simulations used steady-state analysis – add a narrative to justify why a steady-state simulation is appropriate. It's difficult for a reviewer to judge the appropriateness of this approach since the modeling objectives were not stated. For example, if the modeling objective is to estimate the maximum 100-YR water surface elevation ( WSE), then a steady-state flow is appropriate. But if the objective is to identify the maximum bed shear stresses throughout the model domain, or when thresholds are exceeded, then a dynamic (unsteady) simulation is needed because transient processes are critically important, especially in a free-flowing to backwater transition. Peak shear stresses do not occur at peak water surface elevation, at all locations.

Commenting Organization: EPA  
Section: 5.3.2 Page: 5-11  
Specific Comment: 45

Commenter: Mitchell

Clarify what the bullet list represents – there is no common theme for the items listed. These bullet items should be moved to the relevant sections of the report and described in greater detail.

Provide a much more detailed discussion for Bullets 5-7. It's unclear what revisions were made and why. Boundary conditions are critically important parameters and therefore warrant a more robust discussion.

Commenting Organization: EPA  
Section: 5.3.2 Page: 5-12  
Specific Comment: 46

Commenter: Mitchell

Table 5-12 is not introduced anywhere in the text. Presumably the numbers shown represent the water surface elevations used to define the downstream boundary. Please introduce the table and describe the methods, and or data, used to derive the rating curve. Also, make note of any changes made to the rating curve as alluded to in the bullet list on the previous page.

Commenting Organization: EPA  
Section: 5.3.2 Page: 5-13  
Specific Comment: 47

Commenter: Mitchell

A one-sentence paragraph in the middle of page 5-13 reads: *"Water surface profiles, cross-section plots, and output tabulations are included in Appendix G."* This statement has no introduction, context, or explanation for why results from a 1D HEC-RAS model are being referenced and reported? It was stated earlier that a 1D model was not appropriate at this site due to the presence of braided channels. So if the model is not appropriate, why are the results being shown? If there's a good reason for including them, please state why and provide some background information (context) for the 1D model.

Commenting Organization: EPA  
Section: 5.3.2 Page: 5-13  
Specific Comment: 48

Commenter: Mitchell

Text states: *"In the process of developing the cross-section geometry, multiple sources of floodplain data were utilized including the following:"* Provide the context for this statement. Why were cross-sections being developed? The model requires a continuous surface, not cross sections like a 1D requires. Also, the text lists multiple survey sources - were the datums of each data source verified and corrected as necessary? NGVD29 is a rather old datum that isn't commonly used anymore - were the 2012 surveys really conducted in this old datum?

Commenting Organization: EPA  
Section: 5.3.2.1 Page: 5-13  
Specific Comment: 49

Commenter: Mitchell

First sentence of the section says: *"DELFT3D modeling was based on a 5-meter (m) grid resolution..."* DELFT3D uses a curvilinear grid where the primary axis is intended to follow the bank lines. This is necessary to ensure that the bank-lines are boundary-fit. When a curvilinear grid is boundary fit (aligned with) to the bank line, like it should be, the adjacent grid cells become either elongated or compressed; therefore, not all the grid cells are the same size. Please correct the text or explain how the grid cell size is 5m by 5m, and clarify whether the banks are boundary fit. The range of cell sizes should be reported. Also, please provide a figure showing the final grid.

Commenting Organization: EPA  
Section: 5.3.2.1 Page: 5-14  
Specific Comment: 50

Commenter: Mitchell

In the second paragraph, please report the resolution of the survey data in the main channel. It should be higher than the model grid resolution of 5 meters.

Commenting Organization: EPA  
Section: 5.3.2.3 Page: 5-14  
Specific Comment: 51

Commenter: Mitchell

The third paragraph describes extensive interpolation of bathymetric data in the side-channels. Great caution should be used when interpolating results from the side channels since the bathymetric data is missing. This is true for all other areas where the bathymetry was interpolated and not based on measured data. The report should highlight areas where bathymetry was interpolated and state that there is uncertainty in the results in those areas.

Commenting Organization: EPA  
Section: 5.3.2.3 Page: 5-16  
Specific Comment: 52

Commenter: Mitchell

Table 5-6: Explain why only one value was used for the entire channel bottom. The substrate in the backwatered reach is silt/sand while the free flowing reach is composed of gravel. The skin

friction flow resistance will be different between these two reaches. This could explain why the errors are larger in the upper free-flowing reach - a separate n-value for this reach could improve the calibration.

A footnote should also be added stating that the floodplain values have not been calibrated. Please provide a citation for the roughness values assigned to the floodplain. They are very high (nearly double the commonly used values). Please justify the use of such high roughness coefficients. If the n-values are too high in the floodplain, the resulting velocities will be too low, thus under estimating the erosion risk. A more conservative approach would be to err on the side of using lower roughness values in the floodplain (lacking any high flow calibration data).

**Commenting Organization:** EPA  
**Section:** 5.3.2.3      **Page:** 5-18  
**Specific Comment:** 53

**Commenter:** Mitchell

First paragraph: *"There is a good match between the calibrated model and the elevation data at staff gages 3 and 4. The calibration suggests that a re-survey of the staff gage scales and the sill elevations at Otsego City Dam (staff gage 2) would be of value to confirm these elevations on a consistent vertical control."*

The calibration is quite good at low flow at all three sites, but there's a positive correlation between the residuals and flow, and presumably residuals and flow depth. This means that the residuals will increase at higher flows. The modeled water surface elevations are too high for all of the relatively higher flows (>2,000 cfs) which are of greater importance. The calibration should focus on getting a better match at the higher flows. The low flow calibration is not only less relevant to the processes of sediment transport, but the reason for the residuals at low flow is actually more likely to be caused by inaccurate, or low resolution, bathymetry rather than errors in the roughness parameterization. The calibration should be improved for the higher flows (2,000 -3,000 cfs), and consider ignoring the low flow calibration point.

The fact that residuals increase as a function of flow indicates that there may be a larger problem with the flow resistance formulation used by DELFT3D. The residual pattern also suggests that the roughness formulation needs more flow, or depth, dependency. Is the flow resistance formula a function of flow or depth? Flow resistance should decrease with increasing depth - this is well documented in the literature and incorporated in many of today's models - how is this handled in DELFT3D?

The calibration flows are quite low relative to the flows of interest and having residuals that increase with increase with flow is an indication that the model errors at the higher flow rates could be substantial, especially with the use of such high floodplain roughness values as commented on earlier. This issue should be addressed when scoping future data collection and modeling efforts.

**Commenting Organization:** EPA  
**Section:** 5.3.3.1      **Page:** 5-19 through 5-20  
**Specific Comment:** 54

**Commenter:** Mitchell

Comment applies to sections 5.3.3.1 through 5.3.3.3

Tie the presentation of results to the specific modeling objectives. Without stated objectives, there is no context for the presentation of results. There are no questions to answer, or findings to report. The interpretations provided are simple generalizations that could have been made without a 2D hydraulic model.

The ultimate purpose of the model is to characterize the hydraulics and the potential mobility of contaminated sediment in the existing system and to quantify the changes caused by removing the dam. More specifically the model should be used to help answer the following questions:

- What are the bed mobility thresholds? At what flow rate do we expect respective areas to become mobile? When do the known hot spots become mobile? A first look at this can easily be done by comparing shear stresses over a range of flows to critical shear stress thresholds.
- If the dam is removed how does that affect bed shear stresses and how does that affect sediment mobility?
- Does the reservoir behind the Otsego Dam provide any attenuation of peak flow? This is critical to know if dam removal is being considered. If the dam provides hydraulic attenuation, then downstream peak flows, and flood risk, would be increased if it were to be removed.

These objectives should be clearly stated at the beginning of the section 5-3 along with a description of the overall purpose of the model.

**Commenting Organization:** EPA  
**Section:** 5.3.3.4      **Page:** 5-20  
**Specific Comment:** 55

**Commenter:** Mitchell

First bullet states: *"The new modeling effort provides detailed shear stress values across the main channel and floodplain areas that can be merged with sediment size gradations to develop sediment transport and depositional capabilities in the study reach as part of future modeling work."* Please clarify what you mean by "merged". As discussed in the conference call on June 28, 2013, sediment transport modeling will not be performed. Instead, mobility thresholds would be estimated based on critical shear stress. Areas of potential sediment and PCB mobility should be identified in the SRI report based on hydrodynamic model results and mobility thresholds based on critical shear stress.

**Commenting Organization:** EPA  
**Section:** 5.3.4      **Page:** 5-20  
**Specific Comment:** 56

**Commenter:** Mitchell

The report needs to include a new subsection describing the assumptions and limitation of the 2D hydraulic model and its results.

For example:

- Some of the erosive processes that exist in Area 2 are highly complex and cannot be accurately identified, or predicted, with a 2D model. Processes such as bank erosion, erosion from vegetated surfaces, local scour, and avulsions of relic channel braids. Model results should be used in conjunction with field data and geomorphic assessments to comprehensively evaluate the risks of sediment and PCB transport.

Commenting Organization: EPA  
Section: 5.3.3      Page:  
Specific Comment: 57

Commenter: White

First paragraph, last sentence: please correct the figure references to read "Figure 5-12 to 5-35."

Commenting Organization: EPA  
Section: Table 5-7      Page:  
Specific Comment: 58

Commenter: White

Table 5-7 shows units of lbs/ft/s<sup>2</sup> for maximum bed shear stress. Should these units be lbs/ft<sup>2</sup>, or possibly N/m<sup>2</sup>?

Commenting Organization: EPA  
Section: 5.4      Page: 5-25  
Specific Comment: 59

Commenter: White

First paragraph: "Locations OCEP-7, OCEP-6, OCEP-5, and OCEP-12 lie in areas with relatively elevated bank shear stresses. As a result, erosion and material movement would be more likely to occur...which is in accordance with the results of the erosion pin survey." This appears to be the case for locations OCEP-7 and OCEP-6, but locations OCEP-5 and OCEP-12 either don't show erosion (OCEP-5 and 12A) or are not in an area of relatively higher shear stress (OCEP-12B).

Commenting Organization: EPA  
Section: 5.4      Page: 5-25  
Specific Comment: 60

Commenter: White

The potential impacts of flows on PCB transport are described in terms of the relative magnitude of bottom shear stresses (i.e., PCBs in areas of relatively lower shear stresses are not expected to migrate). However, potential PCB mobility is related to whether the bottom shear stresses exceed the critical shear stress, not to whether the shear stress is relatively higher or lower than another location. Conclusions regarding erosion and transport should be deferred to FS (see GP's response to EPA specific comment 85 on the draft Area 2 SRI report).

Commenting Organization: EPA  
Section: 5.4      Page: 5-21  
Specific Comment: 61

Commenter: Mitchell

The CSM is lacking a basic description of the river's current geomorphic trends. For example, is the river channel aggrading, degrading, or in dynamic equilibrium? How did the channel respond to the sediment release from removing Plainwell Dam? Is it still responding?

The CSM is also lacking a description of current hydraulic conditions which could be obtained from the modeling effort. The current CSM should include some of the most basic hydraulic characteristics such as the reach channel slope, threshold discharges for mobility of the channel

bed, threshold conditions for the known hot spots, and the attenuation affect of the reservoir (if any).

The CSM should be updated once the model has been applied with the specific objectives of characterizing the existing system. Currently there is a substantial hydraulic knowledge gap, but the tools exist for filling it.

**Commenting Organization:** EPA

**Commenter:** Mitchell

**Section:** 5.4      **Page:** 5-22

**Specific Comment:** 62

The third paragraph implies that PCBs in the floodplain are at low risk of becoming mobilized. Yet, braided rivers are known to be highly dynamic and are known to reoccupy historic abandon braided channels. Avulsions through abandoned braids are very common and should be considered a moderate risk for PCB transport. The risk of mobilizing PCBs from relic channels should at least be acknowledged.

**Commenting Organization:** EPA

**Commenter:** Dillon

**Section:**      **Table** 6-37

**Specific Comment:** 63

Additional information is needed to allow the reader to understand how the conversion factors were calculated. Include the supporting Attachments from the Area 1 TBERA.

**Commenting Organization:** EPA

**Commenter:** Dillon

**Section:**      **Table** 6-40

**Specific Comment:** 64

Please show the Equation 1 from page 6-40 of the main text.

Suggest a rearrangement of the rows in the table to allow for easier calculation of the HQs and RBCs. This should be discussed further during our upcoming conference call.

Include the supporting Attachments from the Area 1 TBERA.

**Commenting Organization:** EPA

**Commenter:** Dillon

**Section:**      **Table** 6-41

**Specific Comment:** 65

See comments on Table 6-40.

**Commenting Organization:** EPA

**Commenter:** Dillon

**Section:**      **Table** 6-42

**Specific Comment:** 66

See comments on Table 6-40.

**Commenting Organization:** EPA  
**Section:** Table 6-43  
**Specific Comment:** 67

**Commenter:** Dillon

See comments on Table 6-40.

**Commenting Organization:** EPA  
**Section:** Table 6-44  
**Specific Comment:** 68

**Commenter:** Dillon

See comments on Table 6-40.

**Commenting Organization:** EPA  
**Section:** Table 6-47  
**Specific Comment:** 69

**Commenter:** Dillon

Please remove the rows with data from the 5<sup>th</sup> and 95<sup>th</sup> percentile BAFs so that this table only shows the percent of home ranges for the Area 1 PRG and the median BAF. This table, as show, is more associated with the uncertainty section. It can be included as is in that section.

Include the short-tailed shrew results.

**Commenting Organization:** EPA  
**Section:** Table 6-48  
**Specific Comment:** 70

**Commenter:** Dillon

See comments on Table 6-47.

**Commenting Organization:** EPA  
**Section:** 7.1.1  
**Specific Comment:** 71

**Commenter:** White

Second bullet: "A clear relationship between flow and PCB/TSS is not apparent." Please see Farmer Street data set for the winter months from 2001-2006, which appears to show a relationship between TSS and flow, and between PCB and flow (see Figures 5.4-6 and 5.4-7 of the November 2012 draft Area 2 SRI report).

**Commenting Organization:** EPA  
**Section:** 7.1.2  
**Specific Comment:** 72

**Commenter:** White

Please add a summary of PCB distribution with respect to subarea and depth (the horizontal and vertical distribution and extent of PCB contamination).

**Commenting Organization: EPA**  
**Section: 7.1.2**  
**Specific Comment: 73**

**Commenter: White**

Erosion Pin Data: "Erosional processes are not expected to be significant based on the hydrodynamic model results." The data and analyses presented in the SRI report are not sufficient to support this conclusion. Please delete this sentence and address sediment and PCB erosion and transport further in the FS, as proposed in GP's response to EPA specific comment 85 on the draft Area 2 SRI report.

**Commenting Organization: EPA**  
**Section: 7.1.5**  
**Specific Comment: 74**

**Commenter: White**

Sixth bullet: "The areas that exhibit higher concentrations in sediments, Subareas D1 and E, have low shear stress values and low velocities, even under high flow conditions...indicating that PCBs are unlikely to mobilize under current conditions." A comparison of bottom shear stresses to reasonable estimates of the critical shear stress should be provided to back up this conclusion.

**Commenting Organization: EPA**  
**Section: 7.2.1**  
**Specific Comment: 75**

**Commenter: White**

Please delete this section and identify the remediation target areas in the Area 2 FS report.

## **COMMENTS ON THE REVISED TEXT**

### **SPECIFIC COMMENTS**

**Commenting Organization: EPA**  
**Section: Table 1-23**  
**Specific Comment #**

**Commenter: Dillon**

The table currently lists the shrew RBCs and percent home ranges under the high sensitivity columns only. This is misleading and suggests that the shrew RBCs are somewhat analogous to the sensitivity range for the avian RBCs. The table does footnote that there is no distinction between high and low sensitivity for the shrew RBCs. Please add the RBCs and per cent home ranges to the mid-sensitivity columns. The footnote should remain as is.



Commenting Organization: EPA  
Section: Table 2-10  
Specific Comment #

Commenter: Dillon

As with Table 2-13, please add the RBCs for the fox and shrew to the mid-sensitivity columns.  
In addition add a footnote stating that they are the same for these species.